

PHYSIKALISCHES KOLLOQUIUM



Mittwoch, den 02.02.2011, um **15:30 Uhr**

Ort: Reichenhainer Str. 90; Neues Hörsaalgebäude, Raum: 2/N013

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AIXTRON SE

Herzogenrath

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Recent Progress in GaN LED Technology

Solid state lighting applications of LED require advanced, high yield and high throughput MOCVD production technology. To further improve the cost-of-ownership the proven multiwafer Planetary Reactor® as well as the Showerhead reactor family was recently upgraded.

Revolutionary as well as evolutionary steps have led to the introduction of the AIX G5 HT and Close Coupled Showerhead (CCS) Crius II reactors. Both exhibit high wafer capacity configurations with 56x2", 14x4", 8x6"; and 5x8" for AIX G5 HT, and 55x2", 13x4", 7x6" and 3x8" for Crius II.

To assess the performance of the tools a 2 - 3 μm GaN buffer layer was grown at 2 $\mu\text{m}/\text{h}$, followed by further GaN at higher growth rate. The maximally achievable growth rates on the AIX G5 HT were ~ 4.5 $\mu\text{m}/\text{hr}$ and 31 $\mu\text{m}/\text{hr}$ using 800 mbar and 200 mbar reactor pressures respectively, without any reduction of growth efficiency. In a similar manner growth rates > 6 $\mu\text{m}/\text{hr}$ at 600 mbar have been achieved on the Crius II, and data at higher pressure and growth rate will be presented.

MQW and full LED structures were added subsequently to such high growth rate structures including incorporation of a 5 period InGaN / GaN Multi-Quantum Well with pair thicknesses of 16 nm. State of the art peak photoluminescence mapping uniformities will be presented for both tools, including on wafer standard deviations of ~ 1 nm (at 466 nm mean wavelength) for 6" on AIX G5 HT, with a wafer to wafer deviation of 0.3 nm. In run to run experiments utilizing the same recipe a variation of wavelength of 0.3 nm was achieved.

Additional growth, cost of ownership and reactor design information will be presented. Finally an outlook on upcoming new GaN based technologies will be given. InN based materials for red LED as well as novel nanorod LED concepts will be discussed.

Alle Zuhörer sind ab 15:15 Uhr zum Kaffee vor dem Hörsaal eingeladen.